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Relativistic Heavy Ion Collider
Magnet Division Procedure

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Title: RHIC Dipole Magnet Multi-Layer Insulation Installation

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- ES&H Review: Signature on File

REVISION RECORD

Rev. No.	Date	Page	Subject	Approval	QA	ES&H
A	5/22/91		RFP Release.			
B	2/12/92		(ECN No. MG00060) RFP Release.			
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E	1/10/95		Revised as per ECN #MG00730.			

1 Scope:

This specification establishes the requirements for the installation of the insulation blankets for the drawings as given below.

2 Applicable Documents:

The following documents form a part of this procedure.

Drawings

12065038	Blanket, Insulation Multilayer - Magnet, Inner
12065039	Blanket, Insulation Multilayer - Magnet, Outer, No. 1
12065040-01 12065040-02	Blanket, Insulation Multilayer - Heat Shield
12065041-01 12065041-02	Blanket, Insulation Multilayer - Post, Cylinder
12065046	Blanket, Insulation Multilayer - Cradle
12065070	Baffle Assembly
12065097	Blanket, Insulation Multilayer - Magnet, Outer, No. 2

3 Requirements:

NOTE

Perform the following steps (3.1, 3.2, and 3.3) in any sequence. Perform the step 3.1 before installing the cradles to the magnet. Protect insulation blanket while performing non ultrasonic welding.

3.1 Wrap the cradle multilayer insulation blanket (Dwg. 12065046) around the magnet (lengthwise) center so the middle of the blanket width (12 inches) align with magnet (lengthwise) center.

3.1.1 Use 1 inch wide Mylar tape to tape the blanket in place. (3M-Scotch Brand 853, 2 pts, 3-1326-02)

3.1.2 Wrap the left and right cradle multilayer insulation blankets so the middles of the blanket widths are 142 inches from the magnet (lengthwise) center.

3.1.3 Repeat the step 3.1.1.

3.1.4 Punch holes and cut slots through insulation blanket, as required, to install fiducial and straps.

3.2 Wrap the outer wall of the upper post using blanket (P/N 12065041-01) so the edge of blanket is about 1/4 inch from the end (no external flange) of the post. Tape the edges of the blanket to the post using 1" wide Mylar tape. Tape the seam of the blanket.

3.2.1 Repeat step 3.2 for the lower post using blanket P/N 12065041-02.

3.2.2 Wrap the inner wall of the lower post using blanket (P/N 12065041-01) so the edge of the blanket is about 1/4" below the inner flange. Tape the edges of the blanket to the post using 1" wide Mylar tape. Tape the seam of the blanket.

3.2.3 Wrap the inner wall of the upper post using blanket (P/N 12065041-01) so the edge of the blanket is about 3/4" below the "no flange" side of the post [or 1/4" below the sliding post disk closure, (Dwg. 12065062) if the disk is already installed]. Tape this edge of the blanket to the post using 1" wide Mylar tape. Tape the seam of the blanket. Position the blanket so the other edge is about 3/4" from the flange inner surface. Tape the edge using 1" wide Mylar tape.

NOTE

This blanket must be in relax position.

3.3 Perform the baffle assembly per Dwg. 12065070.

3.4 Position one heat shield multilayer insulation blanket, with the 1 mil. thick aluminized Mylar at the bottom, (Dwg. 12065040) on the assembly stand. Align the three 8 inch diameter holes on the blanket over the tow plate bosses. Flip the other heat shield multilayer insulation blanket (Dwg. 12065040) over the first one so the three 8 inch diameter holes on the blanket align over the tow plate bosses.

NOTE

The two blankets should be overlapped 12 inches.

The 1 mil. thick aluminized Mylar layers must be the outermost layers. Install the heat shield tray support plate and the heat shield tray.

NOTE

Perform the step 3.5 before setting cold mass plus cradle assemblies with upper post halves. Attached on top of the post plugs and before installing the helium pipe brackets.

3.5 Place the magnet multilayer insulation outer (No. 1) blanket, (Dwg. 12065039), the 1 mil. thick aluminized Mylar layer at the bottom, on the heat shield tray so the centers of the 8 inch diameter holes align with the centers of the heat shield tray holes.

3.5.1 Place the magnet multilayer insulation outer (No. 2) blanket (Dwg. 12065097), the 1 mil thick aluminized Mylar layer on the top, over the first one so the centers of the 8 inch diameter holes align together.

NOTE

The two blankets must be overlapped 8 inches.

NOTE

Perform the steps 3.5.2 to 3.5.8 after installing the cradles, magnet assembly on the assembly stand and before installing the helium pipe brackets.

3.5.2 Wrap and tape ten (10) strips of the spunbonded polyester over the magnet strap bolts six (6) places to prevent puncturing the magnet blanket.

3.5.3 Place the magnet-insulation-inner blanket (Dwg. 12065038) over the magnet so the closed ends of the cutting slot are snugged between magnet straps and strap bolts.

NOTE

The intact edge of the blanket should be on the outer (convex) side of the magnet (at or about 10 o'clock). The cradle blocks (ears) should be between the cutting slots on the blanket.

3.5.4 Tape the intact edge of the blanket to the magnet every 24 inches using 1 inch by 2 inches long Mylar tape.

3.5.5 Wrap the blanket around the magnet. Do not pull taut.

NOTE

Tug the blanket between the cradles and the magnet.

3.5.6 Use ultrasonic welding gun to weld the overlapped edge to the blanket at 1/2 inch from the edge and 2 inches from the blanket end.

NOTE

Cut existing P/N 12060093-16 which have been welded to P/N 12065038 blanket between ultrasonic welds, as required. Use surplus material to cut into P/N 12060093-17. Use P/N 12060093-17 over the exposed 1 mil. thick aluminized Mylar layer at each ultrasonic weld.

3.5.7 Weld every 24 inches horizontally (1/2 inch from edge).

3.5.8 Fold and tape the blanket flaps to the strips in 3.5.2.

NOTE

Perform the step 3.6 after installing the helium brackets and pipes. Use a metal backing strip to insure a good ultrasonic weld.

3.6 Wrap the first magnet-multilayer-insulation-outer (No. 2) blanket (Dwg. 12065097).

3.6.1 Interleave every 5 compound layers (spunbonded polyester layer must be the outermost layer) so the overlapped edge of the blanket touches the ultrasonic welding line of the underneath layers.

3.6.2 Use ultrasonic welding gun to weld the five (5) overlapped layers to the five (5) underneath layers. The weld is 1/2 inch from the overlapped seam and 2 inches from the blanket end. Do not melt through.

3.6.3 Weld every 24 inches horizontally (1/2 inch from the overlapped edge). Do not melt through.

3.6.4 Repeat the steps 3.6.1, 3.6.2 and 3.6.3 for the rest of the blanket.

3.7 Wrap the second magnet-multilayer-insulation-outer (No. 1) blanket (Dwg. 12065039).

3.7.1 Do the same as step 3.6.1.

3.7.2 Do the same as step 3.6.2.

3.7.3 Do the same as step 3.6.3.

3.7.4 Use a removable metal backing strip to insure a good ultrasonic weld. Cut existing P/N 12060093-02 which have been welded to P/N 12065039 blanket between ultrasonic welds, as required. Use surplus material to cut into P/N 12060093-17. Use P/N 12060093-17 over the exposed 1 mil. thick aluminized Mylar layer at each ultrasonic weld.

3.7.5 Lay the 1/2 inch outside diameter rod on top of the magnet. Use the string (nylon, teflon or lacing tape) to tie the blanket and the 1/2 inch rod securely (every 2 feet). Remove the 1/2 inch rod.

NOTE

Do not damage any insulation layer.

NOTE

Protect insulation blanket while performing non ultrasonic welding.

Perform the following steps after welding the upper shield to the heat shield tray.

Use a metal backing strip to insure a good ultrasonic weld.

3.8 Wrap the first multilayer-insulation-heat-shield blanket P/N 12065040-01.

3.8.1 Interleave every 10 compound layers (spunbonded polyester must be the outermost layer) so the overlapped edge of the blanket touches the ultrasonic welding line of the underneath layers.

3.8.2 Use the ultrasonic welding gun to weld the ten (10) overlapped layers to the ten (10) underneath layers. The weld is 1/2 inch from the overlapped edge and 2 inches from the blanket end. Do not melt through.

3.8.3 Weld every 24 inches horizontally (1/2 inch from the overlapped edge). Do not melt through.

3.8.4 Repeat the steps 3.8.1, 3.8.2 and 3.8.3 for the rest of the blanket.

3.9 Wrap the second multilayer-insulation-heat-shield blanket P/N 12065040-02.

3.9.1 Do the same as step 3.8.1

3.9.2 Do the same as step 3.8.2.

3.9.3 Do the same as step 3.8.3.

3.9.4 Cut existing P/N 12060093-03 which have been welded to P/N 12065040-02 blanket between ultrasonic welds, as required. Use surplus material to cut into P/N 12060093-17. Use P/N 12060093-17 over the exposed 1 mil. thick aluminized Mylar layer at each ultrasonic weld.

NOTE

Perform the step 3.10 after:

- **towing the magnet-shield assembly into the cryostat;**
- **removing the insertion tray and the tow plate;**
- **and securing the top and bottom posts.**

3.10 Slide the baffle assembly (Dwg. 12065070) into the cryostat from the bottom opening so the top of the nylon rod touches the cradle or the cold mass.

NOTE

The baffle assembly must stay inside the cryostat. Otherwise, flatten the baffle (with the cylindrical multilayer insulation attached) and repeat the step 3.10.

4 Quality Assurance Provisions:

N/A

5 Preparation for Delivery:

N/A